



# California's Health

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## EFFECTS OF AIR POLLUTION ON HEALTH\*

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It is easy to overlook the importance to our health of air—a transparent, omnipresent substance. Yet each day we bring into our lungs for equilibration with the blood, some 30 pounds of air; whereas, we take in only about five pounds of water and less than four pounds of food. Man can survive approximately five weeks without food, five days without water, and five minutes without air. Air pollution can decrease our comfort, diminish enjoyment of our lengthening life span, and possibly lead to chronic disease.

### EPIDEMIOLOGIC APPROACH

If it were possible to collect all pertinent information about air pollution and its effects by exposing human beings to various levels of contaminants and concentrations of particulates, under a variety of meteorologic conditions, there would be little need for the epidemiologic approach to these phenomena. But epidemiology derives much of its importance from the fact, among others, that it is a way of collecting information about naturally occurring events, thus sparing the investigator the responsibility for exposing persons to potential health hazards.

It is, in essence, the disciplined observation of selected groups of persons and their response to potential causes of disease. The focus is not on the individual as such. By leading to the prevention of acute illnesses, among them cholera, smallpox, and diphtheria, epidemiologic techniques have made it possible for us to live together

in metropolitan areas without the toll formerly associated with large concentrations of people. But life in a modern city brings with it new health challenges, often of low intensity, but long duration, including problems of mental health, alcoholism, exposure to the by-products of newly harnessed energy forms such as radiation, a variety of chronic diseases, and air pollution.

Natural exposures to air pollution are the raw data collected and scrutinized by the air pollution epidemiologist. Just as epidemiologic studies led to control of waterborne diseases before bacteriology permitted their diagnosis and as the prevention of smallpox was established epidemiologically before its virus was known, so it is hoped that epidemiologic studies may aid in the control of air pollution's effect on health before the phenomenon can be related specifically to disease.

### DEPARTMENT RESPONSIBILITY

In California, the State Department of Public Health has the responsibility for research into the health effects of air pollution, for monitoring air pollution levels, for air pollution surveillance, and a number of related functions. With the exception of automobile exhaust controls, the State does not have responsibility for control of air pollution, which has been left to the local government. The Department has supported or conducted, during the last five years, some sixty studies of the health effects of air pollution. Several basic problems have recurred in most studies: accurate description of the population groups to be observed, definition and meas-

urement of air pollution, definition and measurement of effects that may be traced to air pollution, and the analysis of relationships that may exist between these effects and air pollution. The observations of those of us working on these studies have led us to list these harmful or potentially harmful effects of air pollution:

*Acute sickness or death*, as in the disasters in the Meuse Valley, Belgium; in Donora, Pennsylvania; and in London.

*Causation or aggravation of chronic diseases*, such as chronic bronchitis, pulmonary emphysema, or lung cancer.

*Interference with important bodily functions*, such as lung ventilation, visual adaptation, or blood oxygen transport.

*Somatic symptoms*, such as eye irritation or difficulty in breathing, which in the absence of air pollution as the recognized cause would lead people to seek medical relief.

*Community disorganization* because of dissatisfaction with places of residence and work, as measured by frequency of moves.

### DEPARTMENT STUDIES

Following are examples of the types of study we have conducted in attempting to assay these effects as they occur in California:

#### Mortality

In 1954, a series of three distinct air pollution episodes in Los Angeles led residents to ask whether air pollution might be lethal. The daily number of deaths in Los Angeles County did not appear to fluctuate in response to

\*Based on lecture to staff of Kaiser Foundation Hospital, Oakland, California, January 8, 1960.

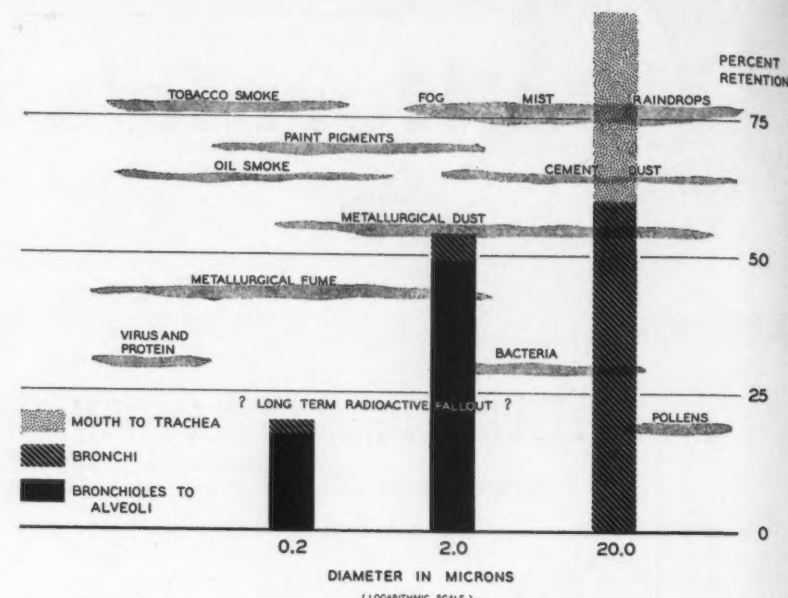
the smog episodes, nor did the daily number of deaths in persons older than 65 years, or deaths due to cardiac or respiratory diseases. However, in late August and early September, 1955, a week of exceptionally high temperature (from 100° to 110° F) was preceded and followed by smog. This was an extraordinary meteorologic condition; and extraordinary meteorologic conditions have been associated with all recorded air pollution disasters. There were about one thousand more deaths during the week in question than in the preceding and following periods. Among the various interpretations of these data that have been offered is the suggestion that air pollution caused the excess deaths. Our tentative interpretation is that the high temperature, rather than the air pollution, was the major cause of the deaths. We incline to this belief because the number of deaths did not rise remarkably during the two or three days of heavy air pollution that either preceded or followed the week of extreme heat.

Shortly before that episode, we had requested from all nursing homes in Los Angeles County containing 25 or more beds (then totaling somewhat fewer than 4,000 beds) a weekly report of daily deaths or transfers to hospitals. During average meteorologic and atmospheric conditions, the daily number of deaths among these frail and elderly persons had ranged from 5 to 12. During the week of high temperature, the daily number of deaths rose to 48.

This profoundly disturbing phenomenon emphasizes the need to take into account the effects of high temperature in interpreting the effects of air pollution. We have observed no episodes clearly associated with increased air pollution.

#### Morbidity

During the three smog episodes of 1954, it was our good fortune to be conducting a morbidity survey on a probability sample of Californians. There was no evidence that the persons under observation experienced more diagnosed sickness or that an unusual number of them were admitted to a hospital during those episodes. But reports from clinicians in Southern California that patients with asthma were disturbed by smog led us to conduct a study for 10 weeks in 1956 in which 137 patients of physicians in private practice in Pasadena reported weekly to a physician on our



SOURCE: LANDAU, MAGILL

FIGURE 1

#### RELATIONSHIP BETWEEN PARTICLE SIZE, ORIGIN AND PULMONARY RETENTION

staff the time of onset or the absence of asthma attacks. A low but positive association was observed between asthma attacks and increased levels of air pollution.

One of the epidemiologist's most baffling problems is the interpretation of low-positive, statistically significant associations. Leaving aside the possible influence of the sight or smell of smog on the asthmatic patient's report of attacks, any of several phenomena could account for the correlation. A majority of patients might be reacting to an occasional episode, or a few might be reacting to almost all episodes. The association observed could have been explained by some eight persons who did react frequently.

Less widely known than the clear-cut causal relationship between cigarette smoking and lung cancer is the doubling of the lung cancer rate in urban over nonurban populations. That this doubling does not occur in California is of particular interest because most residents of California were not born in this State, and the area in which they live here is unrelated to the exposure throughout their previous lives.

In a case-control study, we have observed an unusually high rate of incidence of lung cancer among workers in certain occupations: welders, boilermakers, asbestos workers, ore extractors, fire fighters, painters, and

commercial cooks. Each of these occupations is associated with occupational air pollution, leading us to believe that lung cancer in the population at large may be related to air pollution. More difficult to interpret will be data we are now gathering with the support of the American Cancer Society and the co-operation of the California Chapter of the American Legion on the past and present residence, occupation, and smoking history of 75,000 Legionnaires and 50,000 of their spouses.

The American Legion roster is one of several included in the death search which we have instituted and plan to check against the list of persons who die of lung cancer in California during the next five or ten years. Death search, a powerful epidemiologic technique, consists in the gathering of a variety of identifying information and pertinent history (it may, for example, include physical or laboratory examinations) on all members of the selected population. On the basis of this information, the population is broken down into homogeneous groups. As death certificates are filed, they are checked against the rosters. We now have almost a half million names in our several rosters. Since few persons move out of California, a negligible number is lost to study. A prospective epidemiologic survey of considerable validity is thus made possible, despite

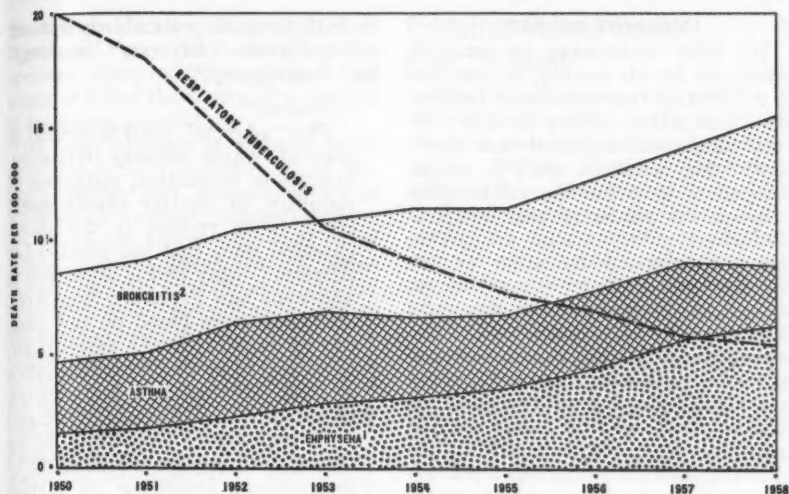


FIGURE 2

#### DEATH RATES DUE TO SELECTED RESPIRATORY DISEASES California 1950-57

<sup>1</sup>Emphysema with bronchitis is included with emphysema.

<sup>2</sup>Bronchitis includes acute bronchitis, bronchitis unqualified, chronic bronchitis, bronchiectasis and other chronic interstitial pneumonia.

SOURCE: State of California, Department of Public Health, Death Records.

inherent problems of interpretation. Death search provides a means of learning, for any given roster, when the members of any group die and of what cause. We have assumed that if registered persons live in communities with air pollution, this prospective study will reveal any relationship that may exist between air pollution and lung cancer. A comparable prospective study is being made for various occupation groups using union rosters.

We are also concerned with the physiologic disposal of inhaled pollutants, especially particles, with respect to pulmonary emphysema. The anatomic sites in which particles of various diameters are believed to come to rest are shown in Figure 1. Particles more than 20 microns in diameter are retained primarily in the mouth, trachea, and bronchi, and do not penetrate to the conducting airways (bronchioles and alveoli). They then are moved through the mucous and ciliary mechanisms of the tracheo-esophageal system into the gastrointestinal tract, when they are ingested. Only about half of inhaled particles 2 microns in diameter appear to be retained by the body. Of those that are retained, approximately half reach the bronchioles and alveoli; if they have a biologic impact, it is at that site. A somewhat smaller proportion of particles, 0.2 microns in diameter, is retained, and a slightly greater proportion of those

that are retained reached the bronchioles and alveoli.

The sizes of the particulates are shown in relation to the types most frequently inhaled in Figure 1. Although pollens are known to affect airway resistance, and this effect is related to the size of the bronchioles, pollens practically never penetrate as deep as the bronchioles, and the mechanism by which they produce this effect is in question. The particles of long-term radioactive fallout are, for the most part, exceedingly small; their physiologic fate is a subject for speculation. Virus and protein particles are minute and go very deep, as does tobacco smoke. Oil smoke also goes rather deep; it may be related to the lung cancer incidence in fry cooks. The size distribution, and hence the fate of lead particles is currently under study. As we learn more about the distribution of various sized particles in the atmosphere, physiologic observations will gain in significance.

A relationship may exist between the inhalation of particulates and both lung cancer and pulmonary emphysema. Just as with lung cancer, the mortality rate from pulmonary emphysema, with or without bronchitis, has risen strikingly within the last seven years, having multiplied by five. If one could conceive of an "epidemic of chronic illness," its curve of incidence would presumably resemble this. We do not feel, however, that the

increase in pulmonary emphysema is wholly real. Physicians may be more alert to the diagnosis; persons with this disease may have moved into California and died here; patients who would formerly have died of pulmonary tuberculosis or bacterial pneumonia tend to survive with modern therapy, but often die of residuals of their illness and pulmonary emphysema may be registered as the cause of death. It is important to note that the urban-rural difference in incidence of pulmonary emphysema, which exists throughout the nation, does not pertain in California. We are investigating the source of this apparent "epidemic" by interviewing the next-of-kin of patients dying of pulmonary emphysema and the physicians who signed the death certificates.

#### Interference With Important Bodily Functions

Recently we have begun to explore the epidemiologic use of physiologic and biochemical measures in relation to the effects of air pollution. Assuming that inhalation of irritants alters the airway so as to increase resistance to air flow, we have been making field tests to estimate maximal flow rate

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and related physiologic properties as measures of lung function. The studies, not yet decisive in results, include the observation of 6500 workmen living in an industrial part of Los Angeles. The methods have included a roentgenographic survey, a questionnaire about the presence or absence of symptoms referable to the respiratory tract, and a simple pulmonary function test. A typical epidemiologist's problem arose during the course of the study; unfortunately, there was little air pollution during the 12 working days of observation, so that we could not learn whether air pollution would have had an effect.

A better opportunity came about during the late summer and fall of 1958, when Dr. Charles E. Schoettlin, then assigned to the Department by the United States Public Health Service, studied air pollution effects on lung function in a group of men with chronic pulmonary disease at the Veterans Administration domiciliary hospital in West Los Angeles. Patients and control subjects were matched for age, smoking history, and pulmonary function. On one day weekly for several weeks, each man was subjected to three types of pulmonary function test and to clinical evaluation. The results of the study are to be published soon.

#### **Somatic Symptoms and Community or Job Dissatisfaction**

In the 1956 California Health Survey, open-end responses were given to questions about community and job satisfaction, the presence or absence of chronic disease, and phenomena that in the respondents' opinion might cause their chronic illnesses to become worse. All questions of this description were asked before air pollution was mentioned; then the question was asked, "Lately there has been some talk about air pollution, such as dust, smog, and so forth. In your community, does air pollution bother you very much, some, or not at all?" Two out of three persons in Los Angeles County and one out of four in the rest of the state answered that they were bothered by air pollution. A number of persons also reported spontaneously that they believe their chronic respiratory diseases are made worse, their symptoms increased, and their community and job satisfaction is diminished by air pollution. We regard their answers and their spontaneous comments as convincing.

#### **LEGISLATIVE MANDATE**

We have undertaken to establish standards for air quality, in response to a directive from the State Legislature. The statute giving us this difficult assignment included this directive: "The standard shall be so developed as to reflect the relationship between the intensity and composition of air pollution, and the health, illness (including irritation of the senses), and death of human beings, as well as damage to vegetation and interference with visibility." The standards, adopted by the State Board of Health on December 4, 1959, apply to air quality and to motor vehicle exhausts. They provided the factual basis for Assembly Bill #17 of the 1960 legislative session, which will require motorists to use exhaust control devices which are to be approved by a special board.

One of our earliest problems was to determine the group of persons whose reactions should form the basis for standards of air quality. It is not economically feasible to protect every individual from sensory irritation or every crop from damage. The protection of the hypersensitive individual is, at least in part, the responsibility of his physician. We therefore based the standards for each pollutant on the response of the *group* of persons in the community most sensitive to the effects of that pollutant. We sought to define these groups according to age and medical criteria, including the body burden of lead and carbon monoxide, and other biochemical criteria. The standards are thus stricter than would be necessary to protect the healthy, adult, male workman—the usual basis of industrial hygiene standards; whereas they are probably not as strict as necessary to protect the desperately ill. Much future work in air pollution epidemiology will probably be directed toward detecting the groups of persons in the population who are most sensitive to various pollutants.

We have compiled a list of studies needed for setting further standards of air quality in relation to health. We have been given some funds by the Legislature to support such research by contract.

#### **PRESENT STANDARDS**

The standards set in 1959, and which will stand until further research permits refinement, were for levels of contaminants in the ambient air. With respect to each contaminant

studied, air quality standards were set at three levels: "adverse," "serious," and "emergency."

#### **"Adverse"**

The "adverse" level is defined as that at which sensory irritation, damage to vegetation, reduction of visibility, or similar effects would occur. With respect to the photochemical smog that has affected Los Angeles County and is beginning to affect the San Francisco Bay Area, standards were based on the quantity of oxidants in the ambient air, as measured by the potassium iodide method. This mixture includes oxidants, ozone, nitrogen dioxide, and other substances. Visibility so reduced as to require pilots to fly by instruments according to airport regulations is defined as "adverse," since it impairs human economic well-being. Levels of sulfur dioxide sufficient to damage plant life are considered "adverse." The threshold for response to sulfur dioxide in some human beings is not much higher.

#### **"Serious"**

This is the level of any contaminant that would alter important bodily functions or cause chronic illness. Thus, the "serious" level of sulfur dioxide is that which caused bronchial constriction on experimental exposures; that for carbon monoxide is the level that interferes with oxygen transport by the blood.

#### **"Emergency"**

This is the level that might cause acute sickness or death in persons categorized as "sensitive."

Studies of carbon monoxide effects provide an example of our approach. As far as this work is concerned, the physiologic effect of carbon monoxide is exclusively its property of combining with hemoglobin and thus interfering with oxygen transport. We selected as the population group most susceptible to carbon monoxide effects, persons with pulmonary emphysema, coronary heart disease, or cerebro-vascular disease. The estimate of the quantity of carbon monoxide that would have a "serious" effect on such patients was based, to a considerable extent, on the effects of hypoxia as observed in aviation medicine. Hypoxia, corresponding to an altitude of 6,000 feet or higher, is generally felt to be a risk to persons with chronic disease. The physiologic effects of carboxyhemoglobin at a comparable level

was then considered. A committee of experts in every field related to the problem reviewed the work at all stages and had the advice of a number of consultants as well.

On these grounds as we came to believe that in an individual of the sensitive group, the production of as much as 10 percent carboxyhemoglobin would put him at some risk. Since cigarette smoke, space heaters, direct exposure to automobile engines, and other sources of air pollution add to the carboxyhemoglobin level in individual cases, we based the standard on the assumption that community air pollution would contribute only half of the tolerable level. The air pollution standard for carbon monoxide then, was one associated with 5 percent carboxyhemoglobin. On the basis of experimental data from other sources, we determined that exposure to 30 parts of carbon monoxide per 1,000,000 parts of air over an 8 hour period would produce 5 percent carboxyhemoglobin and this became the standard at the "serious" level.

The work on carbon monoxide has been outlined in some detail in order to illustrate the care with which the standards were determined. Those finally adopted do not include wide margins of uncertainty as, for example, radiation exposure standards have done. In our opinion, these standards, set on the basis of experimental work and extensive consultation, represent levels at which, in the stipulated population groups, effects may first be detected. The enforcement of these standards will be the responsibility of agencies other than the State Department of Public Health.

#### CONCLUSIONS

Epidemiologic studies in air pollution have led us to the following conclusions:

1. There has been no entirely convincing evidence that acute sickness or death has been caused by air pollution in California. We cannot say whether or not the episodes that we have observed are sufficiently related to air pollution to indicate causation.
2. The relationship of air pollution to certain chronic diseases—lung cancer, chronic bronchitis, and pulmonary emphysema—is suspect, and is being studied further.
3. Air pollution may affect important bodily functions. We are developing new methods for accu-

## California School Health Assn. to Meet

Health, education, and welfare of the school age child is the theme for the 1960 annual meeting of the California School Health Association which will be held October 29-30, 1960 in San Francisco at the Hotel Whitcomb. The program will be of great interest to all school personnel and all people interested in the health of school children.

The speakers for the first general session on Saturday, October 29th will be Dr. Samuel I. Hayakawa, Professor of Language Arts, San Francisco State College and Dr. Edmond H. Volkart, Asst. Professor of Sociology, Stanford University. Speakers for the Sunday afternoon conference include Robert Alway, M.D., Dean, Stanford University; Miss Helen Heffernan, Chief, Bureau of Elementary Education, California State Department of Education; Dr. Marie Fielder, Professor of Humanities, San Francisco State College; Dr. Delbert Oberbauer, Professor of Health Education, Ohio State University.

Special interest groups will have meetings on Saturday morning for staff nurses, junior college nurses, supervising nurses, health coordinators and consultants, physicians and dentists. There will be some joint sessions with the American School Health Association which will meet from October 29th through November 4th.

Further information regarding the conference may be obtained by writing Mr. William H. Wyckoff, Secretary, 451 West Joaquin Ave., San Leandro, Calif.

mulating data related to such functions.

4. Air pollution causes widespread and disturbing symptoms, as revealed by population surveys.

5. Air pollution was given as a common cause of community dissatisfaction in Los Angeles County, and was cited as a frequent reason for changing place of residence or employment.

We therefore conclude that air pollution is a threat to physical and social health, even though in this State it has not yet caused acute illness or death. Epidemiologic studies can provide reliable data on both physical and social effects. The prevention of deleterious effects is the ultimate purpose of these studies.

## USPHS Creates Division of Air Pollution

Creation of a new Division of Air Pollution in the Public Health Service has been announced by Surgeon General Leroy E. Burney.

The new division will consolidate the research, technical assistance and training activities carried out since 1955 by the Air Pollution Engineering and Medical Programs.

Creation of the new division is a logical step to facilitate research and technical assistance efforts in a field where the interdependence of medical and engineering techniques and knowledge is widely recognized and in which research and community field studies increasingly call for the combined talents of many professional disciplines. By bringing all public health air pollution work into one division the Public Health Service will be able to coordinate more efficiently its medical and engineering liaison with state health departments, industry, university, and all the other private and governmental groups.

Chief of the new division will be Vernon G. MacKenzie, engineer, who is at present Assistant Chief, Research and Development, Division of Engineering Services. Staff will include physicians, sanitary engineers, physicists, chemists and other scientists and professional specialists who have previously been working in separate medical and engineering units.

## Personals

**Leslie Corsa, Jr., M.D.**, Chief of the State Department of Public Health's Bureau of Maternal and Child Health, has been appointed to the American Academy of Pediatrics Child Accident Prevention Committee effective October 1, 1960.

**Richard White, M.D.**, Health Officer of Placer County, has been granted a nine month leave of absence for advanced study at Harvard University. He left September 1 and will return June 1, 1961.

The American public is spending increasing amounts of money for all types of medical and dental care. Behind the increase there has been not only some inflation in price, but also a greater use of hospitals, physicians, dentists, and other health services.—*Progress in Health Services, Health Information Foundation, Vol. IX, No. 1.*

## Use of Live Poliovirus Vaccine Recommended by PHS

Leroy E. Burney, M.D., Surgeon General of the United States Public Health Service, has made public the long-awaited news that live poliovirus vaccine will be suitable for use in the United States. He based his statement on a recommendation by the Advisory Committee on Live Polio Vaccines to the United States Public Health Service. This committee, established by Dr. Burney in 1958, consists of six members who are experts in the fields of virology with particular competence in epidemiology and immunology. Roderick Murray, M.D., Director of the Public Health Service Division of Biologics Standards serves as Committee chairman.

Committee members and PHS staff have participated in many international conferences on polio and have met with manufacturers to review and revise earlier recommendations which will serve as the basis for adoption of regulations for manufacture of the vaccine. These include recommendations as to which virus strains are to be used, the general processes of manufacture to be followed, tests to be applied during manufacture, and other factors relating to the continued safety, purity, and potency of the vaccine.

It is believed that the vaccine will not be available in any quantity until about the middle of 1961.

The Committee considers that of the strains available for preparing live oral poliovirus vaccines, Sabin types I and II strains possess the most favorable laboratory and field characteristics. They also recommend use of Sabin Type III, although urging continued search for an even superior type III.

The strains are named for Albert Sabin, M.D., Director of Research at Children's Hospital, Cincinnati, Ohio. Recognition was given to Dr. Herald Cox of Lederle Laboratories and Dr. Hilary Koprowski of the Wistar Institute, Pennsylvania, who promulgated the concept of live oral polio vaccine and provided much of the crucial information which advanced the development of the new vaccine. However, their strains show a greater neurovirulence in monkeys than the Sabin strains. The committee expressed the view that neurovirulence in monkeys is the most important laboratory criterion available for

testing safety. This criterion was used for selecting the strains which are currently being recommended. This is based on the assumption that there is correlation between neurovirulence in man and neurovirulence in monkeys.

### Factors to Consider in Use of Vaccine

While the Committee agrees upon the safety and immunogenic properties of the vaccine, no statement has been made as to whether the three strains should be administered separately or together. It seems certain, however, that high levels of immunity can only be obtained by repeated doses. Schedules of administration will depend upon local conditions since capacity "to take" or "immunogenic effectiveness" of these vaccines is influenced by a number of factors, the most important of which is the prevalence of other enteroviruses in the community being immunized.

It is also believed that the vaccine may be more effective when administered during the winter months, at a time when the "wild" strains of poliomyelitis are in their most dormant period.

Another important factor to consider is the unique nature of the live vaccine which makes it theoretically possible for vaccinated persons to spread the virus in a limited manner to non-vaccinated persons. For this reason the Committee emphasizes that when the vaccine becomes generally available, its use will be more appropriate on a community rather than on an individual basis.

The Committee further stated: "In view of the fact that the nationwide programs with killed virus vaccine failed to achieve the hoped-for elimination of all epidemics of paralytic poliomyelitis, the Committee emphasizes the need for critical assessment of the place of live poliovirus vaccines in the overall picture of poliomyelitis prevention in the U.S.A. The uncoordinated use of live poliovirus vaccine is unlikely to accomplish more than has been achieved with the Salk vaccine as presently employed. It appears probable that only a unified national program which utilizes each of the available types of vaccine to its best advantage can accomplish the total prevention of outbreaks."

For these and other factors relating to the use of the vaccine, Dr. Burney will take up the matter of use with appropriate advisory groups including the State and Territorial Health

Officers, representatives of the medical and health professions and the voluntary health agencies.

### Vaccine Thoroughly Tested

Mass vaccination programs which have been carried out with the Sabin vaccine include those in Russia, Mexico, England, Holland, Italy, Yugoslavia, and Hungary. In Russia alone, pieces of candy containing the vaccine were given to some 60 million persons between the ages of two months and 20 years. There are differences in the Russian and U.S. proposed standards for producing and testing live vaccines, however, and licensing for commercial production and general public use in this country will be based upon evaluations of the field trials done here and abroad.

Carefully controlled field studies in this country in which the Sabin strains have been used include programs in New Haven, Houston, Cleveland, New Orleans, New York City, Nashville, Cincinnati, and Rochester.

One of the largest field trials in the United States was done using the Cox strains in Dade County, Florida. These strains were also tested in Minneapolis and in Ithaca.

In order to anticipate and prepare for the introduction of live poliovirus vaccine in California, an advisory committee to the Department is being formed.

## Medical Technologists to Meet in San Diego

The twenty-first annual meeting of the California Association of Medical Laboratory Technologists will be held in San Diego October 21, 22, and 23 at the U. S. Grant Hotel.

After a board of directors meeting on Friday, buses will take members and guests across the Mexican border to Tijuana for dinner and entertainment that evening. On Saturday a scientific program will be presented by Howard L. Bodily, Ph.D., Chief of the State Department of Public Health's Division of Laboratories; Gilbert Greenspan, M.D., San Diego; Arnold Ware, Ph.D., Los Angeles, and other speakers from the fields of private practice and research. They will discuss such topics as nuclear medicine, serology evaluations, fluorescent microscopy, prothrombin times, the new latex fixation tests, enzyme assays, and medico-legal toxicology.

Many activities for families and guests are being planned for the duration of the convention.



## Public Health Positions

## Alameda County

**Supervising Cerebral Palsy Therapist (Physical):** Salary range, \$481-\$584. Requires completion of recognized training program; California registration; plus three years experience, one of which must have been in treatment of cerebral palsied children.

**Sanitarian:** Salary range, \$481-\$584. Environmental sanitation program including rural and urban areas. Requires graduation from a recognized program plus California certification.

This is a consolidated health program covering all health department services from urban Oakland to rural Livermore and Pleasanton. Applications are accepted on a continuous basis and examinations are arranged at candidate's convenience. For further information inquire, Alameda County Civil Service Commission, 188-12th Street, Oakland 7, HI gate 4-0844, Extension 255.

## California State

**District Administrative Officer in Medical Care Services:** Salary range, \$613-\$745. Position in the San Francisco office of the State Department of Public Health, Bureau of Crippled Children Services. The District Administrative Officer plans, organizes, and supervises the work of a District office and consults with local agencies on a program for medical treatment and the rehabilitation of physically handicapped children. The District office is responsible for all negotiations in arranging medical care for cases in counties which have no administrative units for this purpose. The administrator acts as consultant to independent counties in the district. The District Administrative Officer assists all counties in planning budgets, conducts program reviews, and assists with problems relating to medical care. Requirements: Graduation from college with a minimum of two years of experience in an administrative capacity including or supplemented by one year of experience in a medical care, public health, hospital, social welfare or rehabilitation program. Graduate work in the fields of medical care, public health administration, public administration, social welfare, hospital administration or rehabilitation may be substituted for the year of general administrative experience. Willingness to travel extensively. Applications are obtainable from the State Personnel Board, Sacramento, San Francisco, and Los Angeles, or local Department of Employment offices. Final date for filing applications is October 28, 1960. Examination date is November 19, 1960.

## Contra Costa County

**Public Health Microbiologist:** Salary range, \$458-\$556. Vacancy located in modern health department building in Martinez, California. Candidate must have graduated from an accredited university with a degree in medical or public health bacteriology or the equivalent and possess a valid public health microbiologist certificate issued by the State of California.

**Public Health Nurse:** Salary range, \$458-\$556. Requires a valid California registered nurse license and a certificate as a public health nurse in the State of California.

County residence is not required for either position. Applications and further information may be obtained by writing to Contra

REPORTED CASES OF SELECTED NOTIFIABLE DISEASES  
CALIFORNIA, MONTH OF AUGUST 1960

Disease	Cases reported this month			Total cases reported to date		
	1960	1959	1958	1960	1959	1958
<b>Series A: By Place of Report</b>						
Amebiasis	88	29	32	323	410	839
Coccidioidomycosis	27	16	15	158	173	136
Measles	554	593	617	20,987	38,950	32,964
Meningococcal infections	17	7	14	143	146	130
Mumps	998	420	373	18,631	9,409	14,022
Pertussis	292	214	402	1,258	1,700	2,774
Rheumatic fever	6	6	14	109	100	99
Salmonellosis	155	109	67	846	762	659
Shigellosis	297	212	164	1,357	1,147	1,057
Streptococcal infections, respiratory	1,553	1,143	633	21,869	15,214	9,559
Trachoma	4	--	--	88	21	2
<b>Series B: By Place of Residence</b>						
Chancroid	11	5	14	83	47	62
Conjunctivitis, acute newborn	--	1	--	12	4	12
Gonococcal infections	1,002	1,371	1,077	12,535	11,058	11,328
Granuloma inguinale	--	1	--	10	1	6
Lymphogranuloma venereum	3	--	1	24	15	23
Syphilis, total	792	538	394	5,366	4,608	4,166
Primary and secondary	188	77	52	1,056	703	348
<b>Series C: By Place of Contraction</b>						
Botulism	--	--	--	--	2	1
Brucellosis	--	2	5	13	9	24
Diarrhea of the Newborn	--	24	--	6	40	16
Diphtheria	--	--	--	--	4	5
Encephalitis	48	33	59	387	267	371
Food poisoning (exclude botulism)	32	28	114	1,093	1,000	764
Hepatitis, infectious	619	201	112	2,990	1,690	1,319
Hepatitis, serum	13	3	8	81	61	77
Leprosy	3	1	--	7	11	9
Leptospirosis	1	--	--	1	2	2
Malaria	8	3	1	8	20	13
Meningitis, viral or aseptic	134	151	174	436	472	335
Plague	--	--	--	--	2	--
Poliomyelitis, total	111	83	20	282	226	144
Paralytic	95	68	15	247	188	90
Nonparalytic	16	15	5	35	38	54
Psittacosis	1	2	--	11	13	15
Q fever	1	13	4	29	47	29
Rabies, animal	12	27	10	87	88	130
Rabies, human	--	--	--	--	1	--
Relapsing fever (tick borne)	5	--	--	5	--	--
Rock mountain spotted fever	1	--	--	2	2	--
Tetanus	6	5	3	23	30	33
Trichinosis	1	--	1	2	4	4
Tularemia	--	3	--	2	4	3
Typhoid fever	7	6	6	32	51	38
Typhus fever (endemic)	--	2	--	--	3	2
Other *	--	--	--	--	--	--
Tuberculosis <sup>1</sup>	--	--	--	3,606	3,628	4,177

\* This space will be used for any of the following rare diseases if reported: Anthrax, Cholera, Dengue, Relapsing Fever (louse borne), Smallpox, Typhus Fever (epidemic), Yellow Fever.

<sup>1</sup> Tuberculosis cases are corrected to exclude out of State residents and changes in diagnosis.

Costa County Civil Service Department, P. O. Box 710, Martinez, California. Telephone ACademy 8-3000, Ext. 415.

## Marin County

**Staff Microbiologist:** Salary range \$440-\$530. California Public Health Microbiologist Certificate required. Sick leave, vacation, retirement plan, social security, plus fringe benefits. Apply to Carolyn B. Albrecht, M.D., Marin County Health Officer, 920 Grand Ave., San Rafael.

## Monterey County

**Director of Public Health Nursing:** Salary range, \$523-\$649. Automatic step increase after first six months. To direct a staff of 19 including two supervising nurses in a

program of generalized nursing including some school nursing. Generous retirement plan, three weeks vacation and three weeks sick leave accumulated annually. Voluntary participation in a group health insurance program with county paying a portion of premium. Ten cents per mile auto expense provided. Please contact Myron W. Husband, M.D., Health Officer, Monterey County Health Department, 154 West Alisal Street, Salinas, California.

## San Diego County

**Chief, Bureau of Maternal and Child Health:** Salary range, about \$1052 to \$1160, plus 10% if certified by American Board of Preventive Medicine and Public Health or Pediatrics. Has administrative responsibility

for the health department's maternal and child health program; specific duties include organizing and directing the activities of physicians, dentists and a nutritionist in MCH clinics and in county schools. Graduation from medical school and one year of general internship is required, plus at least four years of professional experience or residency training in public health and/or pediatrics. Experience must include one year with a public health agency in a full-time administrative position in the MCH field, and either an additional year of experience with a public health agency or a master's degree from an approved school of public health. Examination required. Apply to Department of Civil Service and Personnel, Civic Center, San Diego, California.

#### San Jose City

**Public Health Nurse Supervisor:** Salary range, \$517-\$646. Will directly supervise a group of public health nurses in a school and generalized health program. Master's degree with course emphasis on public health nursing supervision and administration, possession of a valid health and development credential, and two years experience in generalized public health nursing required.

**Public Health Nurse:** Salary range, \$463-\$578. School and generalized health program. Requires a California Public Health Certificate and a valid health and development credential. Private car allowance or city car is optional. Apply to Margaret F. Nelson, Chief Public Health Nurse, 151 W. Mission Street, San Jose 10, California.

#### Santa Clara County

**Occupational Health Chemist:** Salary range, \$527 to \$641. Excellent employee benefits. Opportunity to work in a growing occupational health program. Requirements are: training and experience equivalent to completion of a college education with a major in chemistry, one year of experience in analytical chemistry, and knowledge of the field of industrial hygiene and occupational health. Apply to W. Elwyn Turner, M.D., Health Officer, 2220 Moorpark Avenue, San Jose 28, California.

### Lake County Contracts For Health Services

As of October 1, 1960, Lake County will be the eleventh county to come under contract for public health services with the California State Department of Public Health. This will leave only five counties in the State without organized public health services. These sparsely settled counties are Glenn, Lassen, Siskiyou, Tehama, and Tuolumne.

Under the contract a local physician will serve as a part-time health officer; Lake County will provide office space and clerical help. The State Department of Public Health will provide resident public health nurses and sanitarians; necessary public health biologies, and technical supplies; professional guidance and services from public health physicians; a supervisor of public health nursing; a supervisor of sanitation; a health educator; laboratory services; and consultation and assistance from specialists on the various aspects of public health.

By far the majority of California counties provide their own public health services with financial assistance and technical consultation from the State; however, since enabling legislation was passed in 1953, counties with a population of 40,000 or less can contract with the State Department of Public Health for services. Over 112,000 permanent residents in the rural and recreational areas of California, plus thousands

### Cancer Film to Be Shown Throughout State

The California Division of the American Cancer Society and its local branches are now arranging for mass showings of the cancer film, "Time and Two Women". This film will be shown to large groups of women throughout the entire State during a six-week period, extending from October 24 through December 2.

"Time and Two Women," produced by the American Cancer Society in cooperation with the National Cancer Institute, is intended to be helpful in alerting women to their personal responsibility in seeking examination for the early detection of uterine cancer. It has been shown for the past 19 months in California in counties where the medical profession had accepted the promotion of cytological examinations for uterine cancer; however, showings have not reached large numbers.

The film has now been cleared with all medical societies throughout the State and a target for the mass film showings has been conservatively set at four hundred thousand women—a six-week intensive showing schedule that is estimated would otherwise take five years.

who visit and camp in these areas each year, now receive public health services in this way. About 103,000 residents of the State are still without the benefit of organized public health services.

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